

WHAT IS CLAIMED IS:

1. A method of addressing physical problems of a topological network, comprising the steps of:

representing a topology of the network by a plurality
5 of processing elements interconnected via a connection matrix,
said processing elements and connection matrix constituting a
topology engine;

supplying queries representing physical problems of
the network from a host processor of the network to the
10 topology engine;

processing the queries in the processing elements of
the topology engine in accordance with the topology of the
topology engine; and

supplying responses to the queries from the topology
15 engine to the host processor.

2. A method as claimed in claim 1 and comprising the
step of representing a plurality of the processing elements of
the topology engine by different instances of a respective
processor, whereby the topology engine has a smaller number of
20 processors than processing elements.

3. A method as claimed in claim 1 wherein each
processing element of the topology engine has a respective
address and the connection matrix communicates packets between
the processing elements using their respective addresses,
25 wherein the queries and responses are supplied in the form of
packets containing information relating to the queries and
responses, and the step of processing the queries comprises
communicating packets between the processing elements of the
topology engine and processing the packets in dependence upon
30 information in the packets and information stored in the
processing elements.

4. A method as claimed in claim 3 and including the step
of providing said information stored in the processing elements
from the host processor of the network.
5. A method as claimed in claim 4 wherein said
information stored in the processing elements comprises, for
each processing element, the address of each other processing
element for which a connection is provided via the connection
matrix, and at least one parameter associated with such
connection.
- 10 6. A topology engine comprising a plurality of
processing elements and a connection matrix for interconnecting
the processing elements, arranged for carrying out the method
of claim 1.
7. A method of determining connection paths in a
communications network having connections between network
devices managed by a host processor of the network, comprising
the steps of:
representing a topology of said network by a topology
of a connection engine, the connection engine comprising
20 processing elements representing respective network devices and
connections between the processing elements representing
respective connections between the network devices;
supplying from the host processor to the connection
engine a connection search request identifying start and end
25 network devices for a connection;
in response to the connection search request,
communicating information between processing elements of the
connection engine to determine a connection path between
processing elements of the connection engine representing the
30 start and end network devices for said connection; and

supplying information identifying the connection path from the connection engine to the host processor.

8. A method as claimed in claim 7 wherein the connection engine comprises a plurality of processors each having a plurality of different instances constituting respective ones of the processing elements, whereby the connection engine has a smaller number of processors than the number of network devices of the communications network.

9. A method as claimed in claim 7 wherein each processing element of the connection engine has a respective address and the connections between the processing elements are constituted by packet communications using the respective addresses of the processing elements.

10. A method as claimed in claim 9 wherein the connection search request comprises a connection search packet addressed to the processing element of the connection engine representing the start network device for the connection.

11. A method as claimed in claim 10 wherein the step of communicating information between processing elements of the connection engine to determine said connection path comprises propagating connection search packets successively from processing elements receiving connection search packets to other processing elements connected thereto, the successively propagated connection search packets being supplemented with the addresses of the processing elements via which they are propagated, until at least one connection search packet reaches the processing element representing the end network device for the connection.

12. A method as claimed in claim 10 wherein said information identifying said connection path is supplied from

the connection engine to the host processor in a packet from the processing element of the connection engine representing the end network device for the connection.

13. A method as claimed in claim 7 and further comprising
5 the step of supplying from the host processor to the connection engine information for maintaining in the connection engine a record of connections in the communications network.

14. A connection engine comprising a plurality of processing elements and a connection matrix for interconnecting
10 the processing elements, arranged for carrying out the method of claim 7.

15. A method of determining connection paths in a communications network having connections between network devices managed by a host processor of the network, comprising
15 the steps of:

representing each network device by a respective processing element of a connection engine;

representing each connection between the network devices by a respective connection between the processing
20 elements of the connection engine representing the respective network devices;

supplying from the host processor to the connection engine information for maintaining in the connection engine a record of connections in the communications network;

25 supplying from the host processor to the connection engine a connection search request identifying start and end network devices for a connection;

in response to the connection search request,
communicating information between processing elements of the
30 connection engine, via the connections between the processing elements and in dependence upon the record of connections

maintained in the connection engine, to determine a connection path between processing elements of the connection engine representing the start and end network devices; and

5 supplying information identifying the connection path from the connection engine to the host processor.

16. A method as claimed in claim 15 wherein the connection engine comprises a plurality of processors each having a plurality of different instances constituting respective ones of the processing elements, whereby the

10 connection engine has a smaller number of processors than the number of network devices of the communications network.

17. A method as claimed in claim 15 wherein each processing element of the connection engine has a respective address and the connections between the processing elements are 15 constituted by packet communications using the respective addresses of the processing elements.

18. A method as claimed in claim 17 wherein the connection search request comprises a connection search packet addressed to the processing element of the connection engine representing the start network device for the connection, and said information identifying said connection path is supplied from the connection engine to the host processor in a packet from the processing element of the connection engine representing the end network device for the connection.

25 19. A method as claimed in claim 18 wherein the step of communicating information between processing elements to determine said connection path comprises propagating connection search packets successively from processing elements receiving connection search packets to other processing elements connected thereto, the successively propagated connection

search packets being supplemented with the addresses of the processing elements via which they are propagated.

20. A connection engine comprising a plurality of processing elements and a connection matrix for interconnecting
5 the processing elements, arranged for carrying out the method of claim 15.